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Infectious Pinkeye of Cattle

Infectious bovine keratoconjunctivitis (IBK or pinkeye) is a disease known to most cattle producers in Alberta. It can affect the eyes of beef or dairy cattle at any age, although range calves and feedlot cattle are the most frequent victims of the disease. The infection rarely results in death, but production losses in an affected herd may be significant. A survey in the United States estimated that disease losses due to pinkeye amounted to about $23.00 per animal treated. Severely infected cattle, suffering pain, will lose both appetite and body condition and in the worst cases can starve to death. Herd outbreaks can involve up to 80% of the animals and last from three to four weeks.

Causes of pinkeye

There is controversy among researchers about the cause of pinkeye. Some consider pinkeye to be a syndrome, rather than a specific disease entity caused by the bacterium *Moraxella bovis*. This is because many different environmental factors as well as a number of different kinds of bacteria, viruses, mycoplasmas and even worm parasites of the eye appear to play a role in herd outbreaks of infectious pinkeye. Tear secretions in cattle appear to be deficient in an enzyme that kills bacteria (lysozyme). Recent work has shown that infected carrier animals may be of major source of infection. A carrier is an animal that may or may not have suffered from pinkeye in the past and may show no outward signs of disease. Nevertheless, in the presence of a number of predisposing factors, this animal is still able to spread the *M. bovis* bacterium.

Contributing factors

Herd outbreaks of pinkeye may occur at any time of the year, but the incidence is higher during the warm summer months. A number of contributing factors have been identified.

Sunlight — Ultraviolet light from the sun has the potential to seriously damage the cornea of the eyes of cattle. This kind of damage will make the eyes susceptible to invasion and further injury by *M. bovis*.

Lack of pigmentation of the eyelid — Recent field surveys have shown the incidence and severity of pinkeye varies among and within breeds of cattle, i.e. Hereford and Hereford crosses were more susceptible to pinkeye than Angus, Charolais and Holsteins. These reports indicate that the lack of eyelid pigmentation is a major source of variation in breed susceptibility to pinkeye. Since eyelid pigmentation is moderately heritable (26 -34 percent), it has been recommended that only bulls with fully pigmented eyelids be used as herd sires.

Prominence of the eyes — Jersey cattle are highly susceptible to pinkeye. Even though eyelids in this breed are heavily pigmented, it is suspected that the prominence of their eyes may expose them to more intense ultraviolet light.

Fly population — Face flies, (*Musca autumnalis*) particularly when abundant, are associated with higher rates of infectious pinkeye in herds. In addition to being highly irritating to the eyes of cattle, these flies also carry and transfer the bacteria *M. bovis* from infected to non-infected animals.

Resistance related to age — Calves are more susceptible to pinkeye than older cattle. The reasons for this are not understood, but older animals may have a natural immunity to M. bovis because of previous exposure to the bacteria.

Other corneal irritants — Dusty conditions, tall pasture grasses, rough forages, grass seeds, barley awns have all been implicated in pinkeye outbreaks. Winter epidemics of pinkeye have been attributed to ultraviolet light reflected from snow and possibly to low temperature damage to the cornea.

Characteristic signs of pinkeye

The signs of this disease vary from animal to animal. The earliest indications of pinkeye include reddening of the eyeball and swelling of the eyelid lining. This is accompanied by watery discharge from the eye and excessive blinking in bright sunlight. After a day or two, the centre of the cornea becomes whitish in color and may become elevated and ulcerated. Spontaneous healing often occurs at this stage. If healing fails to happen, the area of whiteness progresses to cover the entire eyeball. The discharge from the eye gradually lessens but becomes thicker and more whitish in color. Complete recovery at this stage requires three to five weeks. Severely infected eyes may go on to develop

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penetrating ulcers. Such eyes occasionally rupture and complete blindness results.

Pinkeye is often confused with the presence of foreign material in the eye, physical injury or other diseases. Early cases of cancer eye can look like pinkeye. Infectious bovine rhinotracheitis (IBR) can also resemble the early stages of pinkeye.

Veterinarians are best able to recognize and differentiate the various disease conditions that affect the eyes of cattle. They will also provide professional advice regarding the treatment of pinkeye and the elimination of predisposing factors in the environment.

Effective treatment of pinkeye

There are few good scientific reports of effective treatments for pinkeye. Since spontaneous recovery is not uncommon, some treatment prescriptions have been unjustly credited with being more effective.

Most strains of *M. bovis* appear to be sensitive to tetracyclines, penicillin, erythromycin and neomycin. The bacterium is usually resistant to cloxacillin (commonly found in dry cow mastitis ointments).

The use of aerosol sprays and powders generally cause additional irritation to infected eyes. These products cause increased tear secretion that in turn washes away the antibiotic. Eye drops or ointments are better alternatives for mild or early cases of pinkeye. They are non-irritating and do not result in excessive tear secretion. They do, however, have to be given in repeated doses to sustain adequate drug levels. The injection of a mixture of antibiotics such as penicillin, streptomycin or gentamycin, under the lining of the affected eyelids is recommended in herd outbreaks where repeated treatments are impractical. Often one injection is sufficient, but the treatment will need to be repeated in three or four days for severe or advanced cases of pinkeye. An intramuscular treatment is generally not recommended because very high dosages of an antibiotic are required to ensure adequate levels of the drug reach the eyes and tear glands.

Other methods of treatment include performing eye surgery to protect the affected eyeball from further injury and promote healing or the gluing of protective plastic covers onto the skin around the eyes to avoid further eye irritation. In addition to medical treatment, good management and nursing care is required to bring about full recovery. General recommendations include: housing in shaded areas (to avoid direct sunlight); provision of adequate feed and water; reduction of dust, flies and other physical causes of eye irritation.

Pinkeye prevention

The prevention of pinkeye is difficult because the causes and pre-disposing factors are so varied. Insecticide impregnated eartags are effective for controlling face and horn flies. Tall grasses can be kept short through pasture management, to prevent eye irritation while the cattle are grazing.

The fact that animals are immune to pinkeye for up to twelve months after infection suggests vaccination should be a reasonable means of control. Up to now it has been impossible to make an effective preparation that guarantees immunity against any of the many strains of pinkeye prevalent in the cattle population. It appears the immunity stimulating components are variable from one strain of *M. bovis* to the next. Researchers have not agreed what kind of immunity is required and are still unsure how complete resistance to pinkeye can be achieved through vaccination.

Summary

The bacterium *M. bovis* appears to be an important cause of pinkeye. Other factors, particularly those which cause damage to the eyeball and eye membranes, also appear to be essential for the appearance of the disease. Much remains to be learned about pinkeye. Carrier animals may be important, but their exact role is unknown. The availability of many different antibiotic treatments suggests that none of them are likely to be particularly effective. Fortunately, most cattle recover from infectious pinkeye.

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